

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-  
FOR  
BP WEST COAST PRODUCTS  
ARCO/BP STOCKTON TERMINAL #40T  
ENHANCED BIOREMEDIATION PILOT STUDY  
SAN JOAQUIN COUNTY

This Monitoring and Reporting Program (MRP) incorporates requirements for monitoring the progress of the bioremediation pilot study. This MRP is issued pursuant to California Water Code Section 13267. BP West Coast Products (Discharger) is required to comply with this MRP. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. In addition to this MRP, groundwater sampling and reporting outlined in MRP No. R5-2004-0823 is still required.

All samples shall be representative of the volume and the nature of the discharge and matrix of the sampled medium. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

**REMEDATION PILOT STUDY MONITORING**

**A. LABORATORY PARAMETERS**

Monitoring of the bioremediation pilot study shall consist of collecting groundwater samples from monitoring wells AR/MW-1A, AR/MW-3A, AR/MW-5A, AR/MW-5B, AR/MW-5C, AR/MW-5O, AR/MW-8A, AR/MW-8B, AR/MW-8C, AR/MW-10A, AR/MW-11A, AR/MW-12A, AR/MW-13A, AR/MW-13B, AR/MW-13C, AR/MW-23A, AR/MW-24A and one upgradient well PS-P29. Monitoring wells with free phase petroleum product or visible sheen shall be monitored, at a minimum, for product thickness and depth to water. Monitoring well samples shall be analyzed for the following constituents. These analyses shall be completed by a State certified laboratory and shall follow standard EPA protocol.

Constituents	EPA Method	Maximum Quantitation Limit <sup>1</sup>	Frequency
Depth to Groundwater	---	0.01 ft	A
Total Petroleum Hydrocarbons as Diesel	8015M	50 µg/l	B
Total Petroleum Hydrocarbons as Gasoline	8015M	50 µg/l	B
Benzene	8260B	0.5 µg/l	B
Toluene	8260B	0.5 µg/l	B
Ethylbenzene	8260B	0.5 µg/l	B
Xylenes	8260B	0.5 µg/l	B

*Table continued on the next page.*

Constituents	EPA Method	Maximum Quantitation Limit <sup>1</sup>	Frequency
Methyl Tertiary Butyl Ether	8260B	0.5 µg/l	B
Tertiary Butyl Alcohol	8260B	5 µg/l	B
Ferrous Iron (dissolved)	SM 3500FeD	0.1 mg/L	C
Sulfide	376.2	0.1 mg/L	C
Nitrate (as NO <sub>3</sub> ) and Sulfate	300.0	1 mg/L	C
Nitrite	300.0	1 mg/L	C
Total Nitrogen	4500-N	0.1 mg/L	C
Sodium	6010-B or 200.7	1 mg/L	C
Ammonium (as NH <sub>3</sub> )	350.1	0.5 mg/L	C
Potassium	200.7	1 mg/L	C
Total Alkalinity	310.1 or SM2320B	5.0 mg/L	C
Total Hardness	130.2	1 mg/L	C
Total Dissolved Solids	160.1 or SM2540C	10 mg/L	C
Total Phosphorus and o-phosphate	300	0.15 mg/L	C

1 For nondetectable results.

A Every time a well is sampled.

B Monthly while injection is occurring and quarterly after injection has ceased.

C After injection, weekly during the first month of injection, monthly for the first six months after initiation of injection, and quarterly thereafter.

mg/l Milligrams per liter

µg/l Micrograms per liter

## B. FIELD MEASURED PARAMETERS

Monitoring of the bioremediation pilot study shall include field measured parameters recorded from downgradient wells AR/MW-1A, AR/MW-3A, AR/MW-5A, AR/MW-5B, AR/MW-5C, AR/MW-5O, AR/MW-8A, AR/MW-8B, AR/MW-8C, AR/MW-10A, AR/MW-11A, AR/MW-12A, AR/MW-13A, AR/MW-13B, AR/MW-13C, AR/MW-23A, AR/MW-24A and upgradient well PS-P29 every time these wells are sampled. The field measured parameters to be recorded are listed in the following table.

<u>Constituents</u>	<u>Units</u>
Electrical conductivity	µmhos/cm
pH	pH units
Oxidation-reduction potential	millivolts
Dissolved oxygen	mg/L
Bromide	mg/L
Temperature	°F/°C
Groundwater elevation	Feet and hundredths, mean sea level

Field testing instruments (such as those used to test oxidation-reduction potential and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;

2. The instruments are field calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are provided with the appropriate monitoring report.

## REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., influent, effluent, groundwater, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to the Regional Board. In addition, the Discharger shall notify the Board within 24 hours of any unscheduled shutdown of the enhanced bioremediation system.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

Quarterly reports shall be submitted to the Board by the **1st day of the second month following the end of each calendar quarter (i.e., by 1 February, 1 May, 1 August, and 1 November)**. The reports shall be submitted separately from the quarterly monitoring reports required by MRP No. R5-2004-0823. At a minimum, the reports shall include:

1. Results of groundwater monitoring conducted as part of the pilot study;
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; calculation of casing volume; total volume of water purged, etc.;
3. Copies of all laboratory analytical report(s);
4. Summary data tables of historical and current water table elevations and analytical results;
5. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends, if any;

6. A narrative discussion of the analytical results for all groundwater locations monitored for the pilot study, including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports, as applicable;
7. A comparison of monitoring data to the groundwater limitations, an explanation of any violation of those requirements, and any actions taken or proposed to bring the discharge into full compliance with the waste discharge requirements;
8. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean seal level datum; and
9. An evaluation of the performance of the bioremediation pilot study including an analysis of its effectiveness in destroying the pollutants, the anticipated date for the pilot study effectiveness evaluation and a discussion of the potential for field-scale application;

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program as of the date of the Order.

Ordered by: \_\_\_\_\_  
PAMELA C. CREEDON, Executive Officer

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(Date)